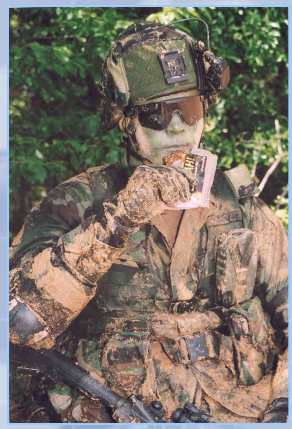
DoD Combat Feeding: Overview & Global Asset Visibility Initiative

October 2003

DoD Combat Feeding



Combat Rations
Combat Feeding Systems
Field Food Service Equipment

Balancing Our Investment

Today's Warfighter:
Continuous Product Improvement

Transformation Planning Guidance/ Joint Vision 2020:
Revolutionary Products and

OEF/OIF Lessons Learned

- ✓ ***LEGACY FORCE efforts on target***
- ✓ ***CR improvements revalidated***
- ✓ ***JV2020 concepts validated/provided***
- ✓ ***GAV needs improvement***

- 15th MEU, Camp Rhino
- 101st AD Div, Kandahar
- 10th Mtn Div, Ft. Drum, NY
- DA Subsistence Analysis Team, OEF
- 101st NCO visit to Natick
- 101st DISCOM, Camp Eagle III, Iraq
- OFIG Rep, Kandahar
- Battle Lab Integration Team Rep, Kandahar
- AMC FAST SWA, STAT, Baghdad
- AMC LSE
- VSA Community, SWA

"… our base has been eating MREs for 42 consecutive days and I must admit I am not tired of them yet. Thank you for making our deployment tastier."
SrA Garrett Palmer

DoD Combat Feeding *Support to OEF/OIF*

OEF/OIF Lessons Unlearned ???

- Inaccurate inventory
- Inconsistent deliveries
- Unidentified containers
- MILVANs lost
- Temperature abuse
- Menu redundancy

"…we have no idea what we have, when it will come, or the ability to control it…" *MG Stratman, DCG, CFLCC OEF*

"…temperature abuse is a significant problem…rations left on the tarmac with no protection…" *COL Cornwell USCENTCOM Staff Vet June 03*

Military RFID Challenges Identified

- **#1 visibility tool: clipboard and carbon paper**
- **#2 visibility tool: AIT**
- **"What's that thing?"**
- **Great tag, but overpriced/oversized/overpowered**
- **Simple hardware/software, but lacks reliability/ease of use**

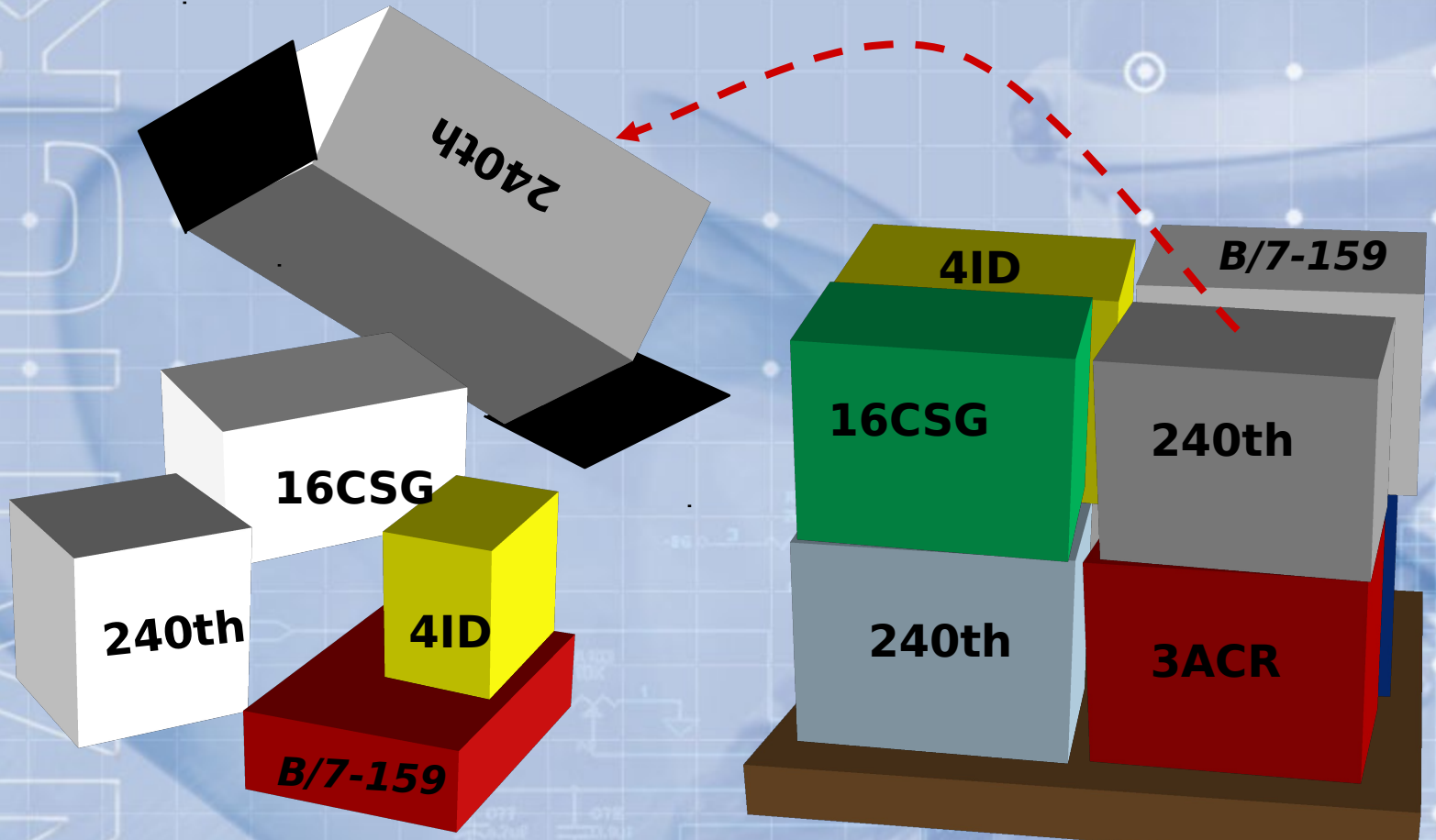
✓ ***Not well trained***

✓ ***No tactical ownership***

✓ ***Poor tag discipline***

MAJ Burke
4-5 Aug 2003
www.dodait.com

The "Worst-Worst" Case Scenario



Multipacks packed with multiple RICs, from multiple nodes

"I was NOT a believer before this operation, didn't think we could manage info, but now know that we can. TAG EVERYTHING."

MAJ Charles Burke
Chief, Logistics Information & Supply Policy
3rd Army/ARCENT & CFLCC

Auto-ID RFID *The Path Forward*

DoD/Academia/Commercial Industry

- MIT Auto-ID Center (MIT, UCC, P&G, Gillette)
- EPCglobal and Auto-ID Labs – Nov 03
- Initiatives: global standards, interoperability & affordability

EPCglobal U.S.

www.autoidcenter.org

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Auto-ID Center *Sponsors*

Board of Overseers

- Proctor & Gamble*
- Gillette*
- UCC *
- Abbot Lab
- Ahold, IS
- Best Buy
- Cannon Inc
- Carrefour
- CHEP
- Coca-Cola
- CVS
- Dai Nippon Printing
- Department of Defense
- EAN International
- Eastman Kodak
- Georgia Pacific
- Home Depot
- International Paper
- Johnson & Johnson
- Kellog's
- Kimberly Clark
- Kraft
- Lowe's
- Mead Wetvaco
- Metro
- Mitsui & Co. Ltd.
- Nestle
- Pepsi
- Pfizer
- Philip Morris
- Sara Lee
- Smurfit Stone
- Target
- Tesco
- Stores
- Toppan Printing
- Unilever UPS
- US Postal Service
- Visy Industries
- Wal-Mart
- Wegmans Foods
- Westvaco
- YFY Group

Technology Board

- AC Nielsen
- Accenture
- ADT/Sensormatic
- Alien Technology
- Arbitron
- Applied Wireless ID
- Avery Dennison
- British Telecom
- Cap Gemini Ernst & Yng
- Cash's
- Catalina Marketing
- Checkpoint Systems
- ConnecTerra
- Ember Corporation
- Embrace
- Flexchip AG
- Flint Ink
- GEA Consulting
- GlobeRanger
- IBM
- ID Tech Ex
- Unpinj, Inc
- Information Resources
- Intel
- Intermec
- Invensys Controls
- Ishida
- KSW Microtec AG
- Manhattan Assts.
- Matrics
- Marrkem Corp
- Morningside Tech
- NCR
- Nippon T&T
- NTT Comware
- OatSystems
- Philips Semi
- PSC, Inc.
- Provia Software
- Rafsec
- RF Saw
- SAMSYS
- SAP
- Savi
- Sensitech
- Sensormatic
- Siemens
- ST Microelectronics
- Sun Microsystems
- Symbol Tech
- TAGSYS
- ThingMagic
- TIBCO Software
- Toppan Forms
- Toray Intl
- UNISYS
- Vizional Tech
- Verisign
- Vizional Tech
- Zebra Tech

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U.S. ARMY NATICK SOLDIER CENTER

Auto ID *Technology*

Electronic Product Code (EPC)

21.203D2A9.16E8B8.719BAE03C

- Version 8 bits
- Manufacturer 28 bits (> 268 Million)
- Product 24 bits (> 16 million)
- Serial Number 36 bits (> 68 billion)

EPC

Savant Computer

- Distr. architecture
- Data mgt
- Task mgt

ONS Server

- Directs EPC to item info
- Quick retrieval

PML Server

- Item info
- Maintained by DoD/vendors

DoD Current/Future Systems

Tags

***class 0/1* - passive**
write once read many (WORM), mfg (0)/ custome
(1) programmable, beam powered by reader, 1-1
m

***class 2* - passive**
class 1 + increased functionality, e.g. more memory, R/W, sensor capability (point in time) - 1-10 m

***class 3* - semi-passive**
class 2 + read/write, battery powered, enables I/O, modularity, sensor profile/manifest capability, 30-100 m

***class 4* - active**
class 3 + broadcasting capabilities, “sensor network”

***class 5* – reader spec**

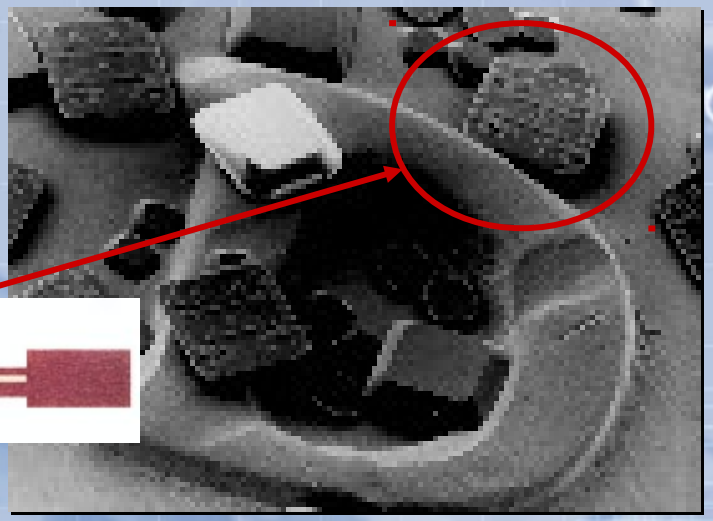
Class 0/1 - Auto-ID Spec version 1.0

Version 2.0 specs* for all *classes (13.56 MHz, 915 MHz, 2.45 GHz) in progress

Tags *Combat Feeding Tech Demo*

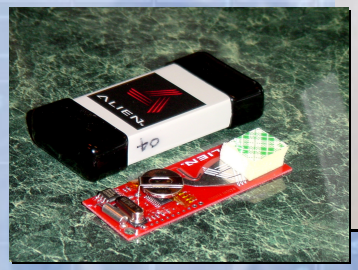
Passive

Class 1 EPC NanoBlock™ I-tag



Semi-Passive

Battery assisted Passive
(future Class 3) EPC tag

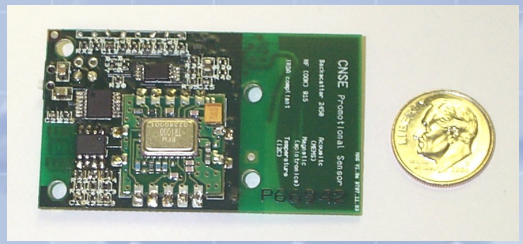


Tag/Sensor Evolution

MAS sensor CNSE/NDSU

Sensors:
Temperature
Changing Magnetic Fields
Acoustical Noise

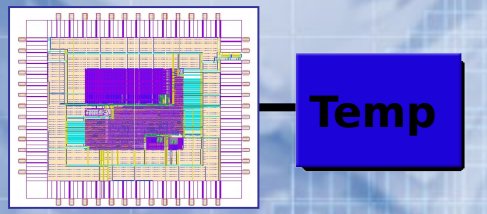
Communication Modes:
Active RF / Backscatter
IR



Printed Circuit Board

+ ASIC technology

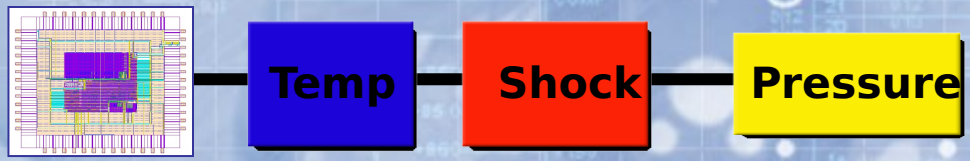
Future Class 2 EPC NanoBlock™ Tenali™ IC & NanoBlock™ temperature sensor



Tenali ™ ASIC

+ battery & adv. sensor technology

Future Class 3 Type EPC NanoBlock™ sensor tag



Journey to DoD EPC Adoption

FY01

- Combat Feeding/MIT meeting
- DLA
- MIT Board of Overseers

FY02

- Senate/House Soldier Modernization Day
- DMEA Program Review
- QMC&S Regimental Week

more ....

FY03

- DDC/DDJC
- DLA J-3
- Army G-4
- PEO Ships
- PD USD AT&L
- DUSD L&MR SCI
- USD ATL
- Cong Staffers
- CG, AMC

more ....

"...the Combat Feeding Directorate is "way out ahead of everyone else in DoD..." (relative to RFID)

The Honorable Michael Wynne

DoD RFID Policy

"DoD will be an early adopter of innovative RFID Technology that leverages the Electronic Product Code (EPC) and compatible RFID tags" 2 Oct 2003

- ***...to be implemented immediately***
- ***...passive tags on case/pallet (selected suppliers) Jan 05***
- ***...business rules based on results of initial RFID projects***
- ***...final policy July 04***
- ***...supports USD ATL UID policy***
- ***...implementation - DoD RFID Integrated Product Team (IPT) DUSD LMR SCI (Mr. Estevez) supported s AIT***

www.dodait.com

22-23 Oct 2003

Combat Feeding Tech Demo

Scope

- Commodity: MREs and UGRs
- Passive RFID tags (case & pallet)
- Semi-passive (pallet & container)
- Track depot & supply point issues/receipts
- Shelf life quality model
- Supply chain visibility to Class 1 Theater Mgr
- Tech demo (DDJC, 2Q04)

Demo Partners:

DLA * DDC * DDJC * ORNL

USA Veterinary Services Agency

MIT * Navy AIT

Combat Feeding Tech Demo

VENDOR

DLA/DSCP
Funded Requisition

EPC: case/pallet

DDC

EPC: pallet/container

POE / POD

EPC: container

Class 1
Theater
Manager

UNIT

EPC: case/pallet

DS

EPC: pallet/container

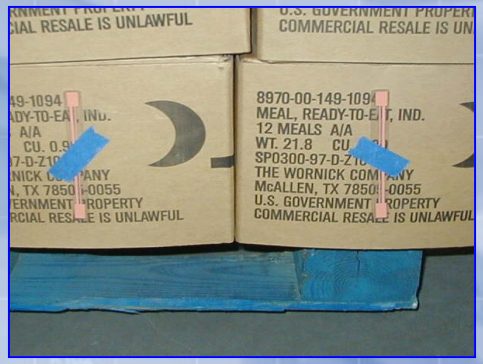
GS

Combat Feeding Auto-ID Tech Demo

Activities to date

- Preliminary testing (Alien, Feb 03)
- Shakedown (DDJC, March 03)
- Follow-on testing (July - Dec 03)

Preliminary Testing



Test set-up – "Area 52"

Class 1 tag placement on UGRs

Class 1 tag placement on MREs

Battery powered time/temp & manifest tags

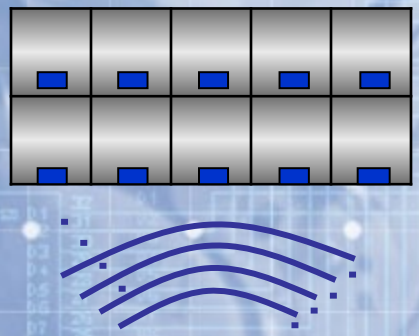
Shakedown *Tag Manufacturers and Classes*

SAVI MATRICS ALIEN

Pallet/Container	Auto-ID Compliant
2.45 GHz Battery Semi-Passive Temp & Manifest	In-process
915 MHz Wood Tag Passive	No
433 MHz EchoPoint "Beacon" Tag Active	No

Case	Auto-ID Compliant
915 MHz Class 1 Passive NanoBlock™	Yes
915 MHz Class 0 Passive	not at Shakedown
N/A	N/A

Shakedown *Battery Tag*



Simulated loading/unloading entrance/exit portal

Reading loaded ISO

Reading battery tags in transit

Shakedown *Passive Tag*

Class 1 tags on MREs

Reading Class 1 tags on UGRs

Other commodities (#10 cans, pouch bread, paper trays)

Follow-On Testing

Passive Tag

5-6 mph – 90%
3 mph - 100%

Check Tag

MRE – 100%
UGR – 80% & 100%

Forklift

500 bytes/3-4 sec
(500 data points)
1.4 years temp data (1/day)

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Shelf Life Model

- ground truth data
- activation energy
- Arrhenius constant
- temperature
- quality of food
- order of reaction

SHELF LIFE MODEL

Commercial Activity/Deployment

- **Industry Pilots/Business Cases:** Proctor and Gamble, Gillette, Wal-Mart, Tesco, Toppan, CVS, Marks & Spencer, etc…
- **Alien** announces major order for ***500 Million*** EPC RFID Tags for **The Gillette Company** (Jan 2003)
- **Wal-Mart** announces…top **150** suppliers to start using EPC case level by 1 Jan 2005; all suppliers case/pallet by 2006
- **Microsoft** exploring membership in EPCglobal™ (June 2003)
- **Upper Great Plains Tech Conference** (Sen. Dorgan) "RFID Technology and the Future of

CFD Plans *near term…mid term…long term*

- DOD/DLA systems interconnectivity (demo expansion) *in progress*
- Business Case Analysis - DLA/MIT
- DoD implementation strategy sessions - OSD, EPCglobal, & Auto-ID Labs
- Totally integrated systems approach for end-to-end logistics ICW industry/academia
- FY05-08: extension of tech demo platform
  - affordable EPC compliant tags/readers
  - expand shelf life model ICW USAVSA
  - sensor integration for food quality/safety assessment

~~Wish List~~ "To Do"

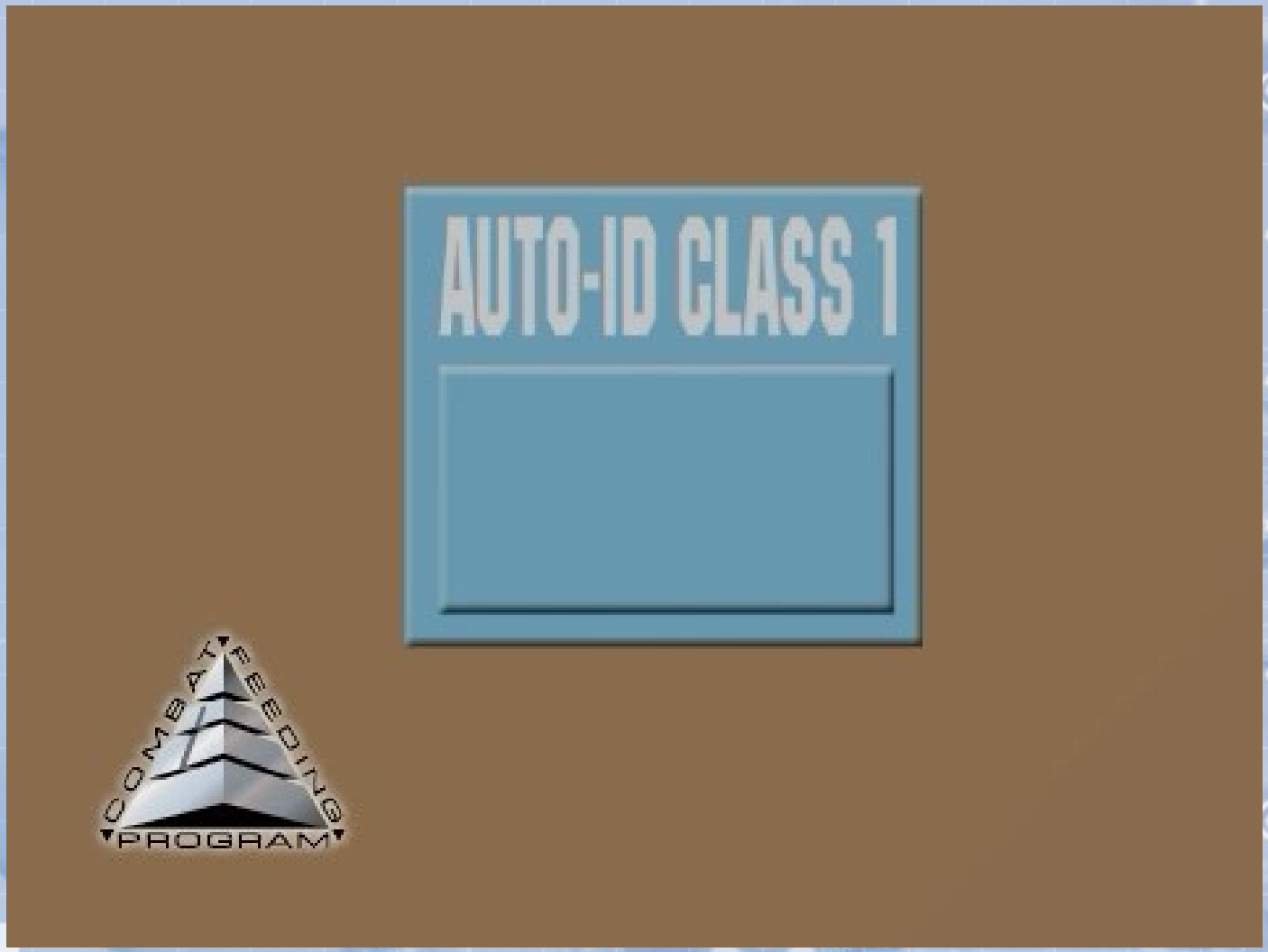
- CF Tech Demo: hand held reader 915 and/or 2450 MHz
- Auto-ID Spec 2.0 passive/semi passive/active tags tags
- More lessons learned (DoD/DLA/commercial pilots)

- Academia/industry PARTNERSHIPS:
  - VOC/DNA sensors (food quality and safety)
  - Environmental testing of tags
  - Vendor implementation

GEN Kern, 16 Oct 03, *"I appreciate this great work", we must expand to other areas"*

- AFFORDABLE Solutions:
  - $.01 Tag (ASIC/FSA)
  - $1.00 sensor/manifest tag

Concept of Operations



Natick Soldier Center/DOD Combat Feeding

Meeting Today's Challenges
Providing Tomorrow's Solutions

Doing great things for the Warfighter everyday for the